A TABLE FOR THE GRAPHIC CHECK OF THE METHOD OF CONSTANT STIMULI

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The graphic representation of the actual and of the theoretical values of p in connection with the Method of Constant Stimuli may serve as much more than a mere rough check upon the accuracy of the mathematical operations. The relation of the actual to the theoretical distribution of percentages, when presented graphically, reveals to the student just coming into psychophysical work the results of his rather arduous labors in a way which he can grasp. To tell him that the steepness of the curve determines the value of h, and that the 50% ordinate where it cuts the curve gives L in terms of the abscissa units, may mean more or less to him,—usually the latter. If he plots the curve of actual distribution alone his case is but little better; he must plot the theoretically best fitting curve over the actual. His knowledge of the use of the principle of least squares to get the best fitting curve is no more complete than before, but he can see that it does come out of his labors. With the two curves before him it is much easier to make him understand the principle of the law of error and the relation of a distribution due to 'sampling' to a distribution based upon an infinite series. It is also an easy way to show the relation of the ogive curve to the 'normal' curve of distribution, a relation which is by no means as evident to the beginner without mathematical background of the right kind as one is likely to assume. It serves as an excellent opportunity to show why the value of L is different from any one of the stimulus-values used.

For these reasons and also because it does serve as a check, rather rough to be sure, upon the work of a student, the instructor in a drill course often does well to plot the theoretical curve. Boring[1] gives directions for deriving the values and plotting the curve as well as the pedagogical advantages which come from its use. Also, as Boring points out[2], if we are to apply the principle of the sum of the squares of the differences as a test of adequacy, we must at least find the values for p_t and

[1]E. G. Boring, Urban's Tables and the Method of Constant Stimuli, *Amer. Jour. Psychol.*, 28, 1917, 288 and 291.

[2]*Op. cit.*, 288.

γ	p	γ	p	γ	p	γ	p
.00	.5000	.50	.7603	1.00	.9214	1.50	.9832
.01	.5057	.51	.7646	1.01	.9234	1.51	.9837
.02	.5113	.52	.7690	1.02	.9254	1.52	.9842
.03	.5169	.53	.7733	1.03	.9274	1.53	.9848
.04	.5226	.54	.7775	1.04	.9293	1.54	.9853
.05	.5282	.55	.7817	1.05	.9312	1.55	.9858
.06	.5338	.56	.7858	1.06	.9331	1.56	.9863
.07	.5395	.57	.7899	1.07	.9349	1.57	.9868
.08	.5451	.58	.7940	1.08	.9367	1.58	.9873
.09	.5508	.59	.7980	1.09	.9384	1.59	.9878
.10	.5563	.60	.8020	1.10	.9401	1.60	.9882
.11	.5618	.61	.8059	1.11	.9418	1.62	.9890
.12	.5674	.62	.8097	1.12	.9434	1.64	.9898
.13	.5730	.63	.8135	1.13	.9450	1.66	.9906
.14	.5785	.64	.8173	1.14	.9466	1.68	.9913
.15	.5840	.65	.8210	1.15	.9481	1.70	.9919
.16	.5895	.66	.8247	1.16	.9496	1.72	.9925
.17	.5950	.67	.8283	1.17	.9510	1.74	.9931
.18	.6005	.68	.8319	1.18	.9524	1.76	.9936
.19	.6059	.69	.8354	1.19	.9538	1.78	.9941
.20	.6114	.70	.8389	1.20	.9552	1.80	.9946
.21	.6168	.71	.8424	1.21	.9565	1.82	.9950
.22	.6222	.72	.8457	1.22	.9578	1.84	.9954
.23	.6275	.73	.8491	1.23	.9591	1.86	.9958
.24	.6329	.74	.8524	1.24	.9603	1.88	.9961
.25	.6382	.75	.8556	1.25	.9615	1.90	.9964
.26	.6435	.76	.8588	1.26	.9626	1.92	.9967
.27	.6487	.77	.8619	1.27	.9638	1.94	.9970
.28	.6540	.78	.8650	1.28	.9649	1.96	.9972
.29	.6592	.79	.8681	1.29	.9660	1.98	.9975
.30	.6643	.80	.8711	1.30	.9670	2.00	.9977
.31	.6695	.81	.8740	1.31	.9681	2.05	.9982
.32	.6746	.82	.8769	1.32	.9691	2.10	.9985
.33	.6797	.83	.8798	1.33	.9700	2.15	.9988
.34	.6847	.84	.8826	1.34	.9710	2.20	.9991
.35	.6897	.85	.8854	1.35	.9719	2.25	.9993
.36	.6947	.86	.8881	1.36	.9728	2.30	.9995
.37	.6996	.87	.8907	1.37	.9737	2.35	.9996
.38	.7045	.88	.8934	1.38	.9745		
.39	.7094	.89	.8959	1.39	.9754		
.40	.7142	.90	.8985	1.40	.9762	2.40	.9997
.41	.7190	.91	.9010	1.41	.9770	2.45	.9998
.42	.7238	.92	.9034	1.42	.9777	2.50	.9998
.43	.7285	.93	.9058	1.43	.9785	2.55	.9999
.44	.7331	.94	.9082	1.44	.9792	2.60	.9999
.45	.7378	.95	.9105	1.45	.9799	2.65	.9999
.46	.7424	.96	.9127	1.46	.9806	2.70	.9999
.47	.7469	.97	.9150	1.47	.9812	2.80	1.0000
.48	.7514	.98	.9171	1.48	.9819		
.49	.7559	.99	.9193	1.49	.9825		

take the difference between these and the actual values of p. The appended table is not sufficiently accurate for this purpose except in a demonstrational way, if indeed a demonstration may ever be less refined than what careful work demands.

In order to make the change from γ_t to p_t easier and quicker Dr. J. M. Gleason, as mentioned by Boring[3], computed from the table of Bruns the values of p_t for all the two-place values of γ up to 1.50 and from there on every tenth value. It is this table, slightly extended, which we here present in the hope that it may be of use to others, in drill-courses if not otherwise. For very accurate work one must still go to the more extended tables of Bruns and Kämpfe.[4] Our table is, in intent, in line with other tables, such as Rich's checking table,[5] the purpose of which is to reduce the mere mechanics of the work to the lowest possible limit consistent with the degree of accuracy which the task in hand demands.

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[3] *Ibid.*, 292.

[4] H. Bruns, *Wahrscheinlichkeitsrechnung und Kollecktivmasslehre*, 1906. B. Kämpfe, *Philos. Stud.*, 9, 1893, 147 ff.

[5] G. J. Rich, A Checking Table for the Method of Constant Stimuli, *Amer. Jour. Psychol.*, 29, 1918, 120-121.